Space Weather Forecast

Issued on Monday, 15 July 2024 at 13:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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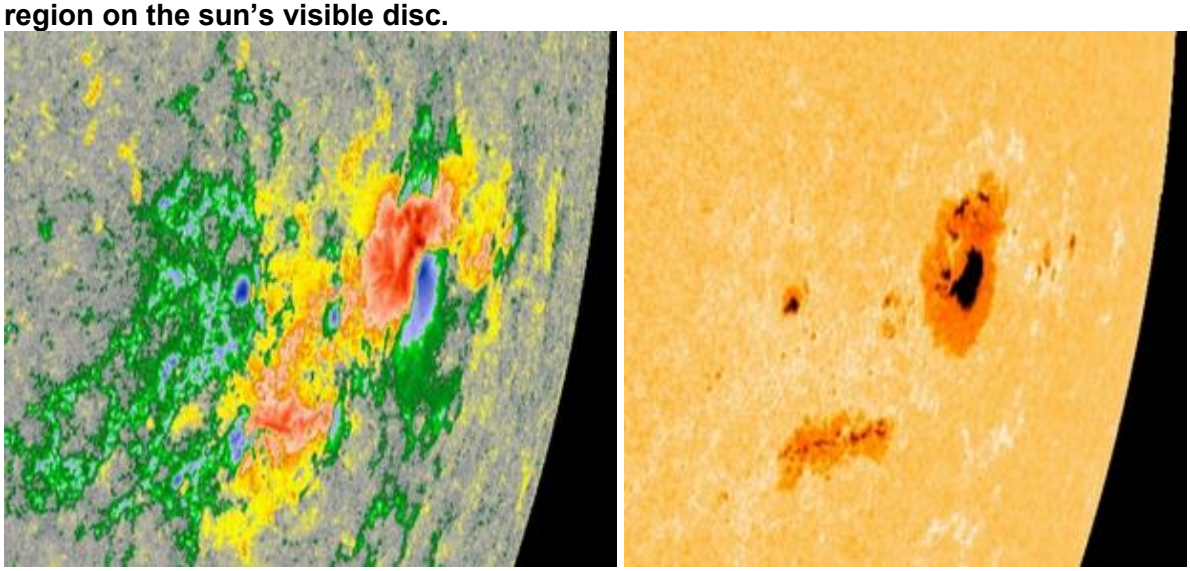
Space Weather Forecast Headline: Moderate-class X-ray flares likely (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with an M2.7 flare at 15/0937 UTC from AR3738. There are now up to thirteen sunspot regions on the facing side of the Sun. The largest and most complex region is now approaching the western limb. Its overall size has started to decrease, having lost a few peripheral spots, but it remains magnetically complex. Another large region has recently emerged from the eastern limb. It consists of two spots with penumbra pretty much coaligned east-west, with several intermediate spots in-between. A small delta spot is now confirmed on the leading group of a region located in the northeast quadrant. The other regions are considered to be relatively small and simple, including the new regions that have recently developed on the northwest quadrant. A new region is also emerging on the northeast quadrant but its analysis is incomplete due to the sharp angular view.

Despite the number and scale of solar flares, no Earth-directed Coronal Mass Ejections (CMEs) have been observed. Some dimming was observed near the region responsible for the recent M2.7 flare, potentially indicating the release of a CME but we will only find out once satellite imagery becomes sufficiently available. Another CME may have been spewed from the new sunspot region currently emerging on the northeast limb. None of these affect the forecast.

Figure 1: HMIBC (left) and HMIIF (right) 15/1215 UTC, showing the largest and most active region on the sun's visible disc.



Solar Wind / Geomagnetic Activity: The solar wind signal comprised variations on a slow regime. The solar wind speed was at background levels, as was the number of particles

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comprising the wind and their associated magnetic field. The net result of the above solar wind measures was for provisionally quiet geomagnetic indices throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, despite numerous large X-ray flares from a potentially prone location (the largest sunspot region nearing the western solar horizon).

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely, with a slight chance of further Strong-class flares, most likely from the most complex region. This risk abates slightly after midweek with the main sunspot group leaving the facing side of the Sun.

Solar Wind /Geomagnetic Activity: No Earth-directed CMEs feature in the forecast. With no immediate source of solar wind enhancements, geomagnetic activity is expected to be mostly Quiet from Day 1 to Day 3 but Unsettled to perhaps Active with a slight chance of a G1/Minor Storm interval on Day 4 (18 July).

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a slight chance of rising in response to any notable flares, mainly from the large off-going sunspot.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	60
Very Active	R3 to R5 X	No	10	10	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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